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May 16, 2007

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: GN Docket No. 07-45: In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996

Dear Ms. Dortch:

NuVox Communications and XO Communications, LLC, through counsel, hereby submit their initial Comments for filing with the Commission in the above-referenced proceeding. Please feel free to contact the undersigned counsel at (202) 342-8625 if you have any questions, or require further information.

Respectfully submitted,

Brett Heather Freedson

cc (via email): Daniel Gonzalez
Nicholas Alexander
Scott Deutchman
Scott Bergmann
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Before the
FEDERAL COMMUNICATIONS COMMISSION

In the Matter of	)	
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996	)	GN Docket No. 07-45

COMMENTS

NuVox Communications and XO Communications, LLC (the "Commenters") through counsel, hereby respond to the Notice of Inquiry in the above-captioned proceeding, seeking comment on the whether broadband services currently are being made available to all Americans in a reasonable and timely manner, consistent with the mandate of Section 706 of the Telecommunications Act of 1996.[1] The Commenters ask the Federal Communications Commission (the "Commission") to take notice of technological developments that enable transmission of high speed and advanced services over legacy copper loop facilities, increasing competition among providers of those services, and expanding service offerings available to residential and business customers. Importantly, the Commission also should consider, as a means of ensuring the most widespread and efficient deployment of high speed and advanced services over copper loop facilities, changes to its existing rules applicable to copper loop and copper subloop retirements that reflect industry and marketplace changes since the *Triennial*

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1 *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, GN Docket No. 07-45, Notice of Inquiry, FCC 07-21 (rel. Apr. 16, 2007) ("Notice of Inquiry").

Review Order.[2] Regarding the specific issues raised by Commission in the Notice of Inquiry, the Commenters respectfully submit as follows.

I. NEXT-GENERATION COPPER-BASED WIRELINE TECHNOLOGIES MAKE COPPER ONE OF THE MOST IMPORTANT AND CAPABLE PLATFORMS FOR DELIVERING HIGH SPEED AND ADVANCED SERVICES

Consistent with Section 706 of the Telecommunications Act of 1996, the regulations and policies of the Commission must facilitate both intramodal and intermodal competition among providers of high speed and advanced services, and must promote technological innovations that support the provision of such services over legacy copper networks.[3] In the *Triennial Review Order*, the Commission challenged competitive LECs, and equipment manufacturers alike to undertake significant infrastructure investments in equipment necessary to deliver high speed and advanced services over copper facilities.[4] Specifically, the Commission concluded that such investments in copper-based wireline technologies would "unleash the full potential of embedded copper loop plant," and in so doing, would enable consumers to experience high speed and advanced services before mass deployments of fiber loops.[5] Furthermore, the Commission

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2 *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act of 1996; Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket Nos. 01-338, 96-98 and 98-147, Report and Order and Further Notice of Proposed Rulemaking, FCC 03-36, 18 FCC Rcd 16978 (rel. Aug. 21, 2003) ("*Triennial Review Order*"); *see also In the Matter of XO Communications, LLC, Covad Communications Group, Inc., NuVox Communications and Eschelon Telecom, Inc. for a Rulemaking to Amend Certain Part 51 Rules Applicable to Incumbent LEC Retirement of Copper Loops and Copper Subloops; In the Matter of Policies and Rules Governing Retirement of Copper Loops by Incumbent Local Exchange Carriers*, RM-11358. Among other things, the rule changes proposed by the Petitioners in RM-11358 are intended to safeguard valuable copper infrastructure, including the feeder portion of loop, from incumbent LEC retirements that do not serve the public interest.

3 *Triennial Review Order* ¶ 244.

4 *Id.*

5 *Id.*

anticipated that product and service innovations would follow such infrastructure investments,[6] encouraging competition through more diverse offerings of high speed and advanced services.

As the result of significant advances in technology in recent years, copper facilities now, more than ever, are essential to deploying high speed and advanced services to all Americans, in a reasonable and timely fashion. In particular, copper-based wireline technologies currently deliver both "symmetric" and "asymmetric" broadband services to business end users, and enhanced bundles of video, Internet access and voice services to residential consumers, at transmission speeds ranging from 10 megabits per second, up to 100 megabits per second.[7] Indeed, most providers of high speed and advanced services typically rely on relatively ubiquitous copper networks to support their next-generation offerings.[8] The rules and policies of the Commission therefore must reflect that copper-based wireline technologies continue to make copper the most important infrastructure platform for delivering high speed and advanced services, and that, for the foreseeable future, legacy copper loop plant will continue to be the most ubiquitous network capable of supporting widespread deployment of those services to most Americans.[9]

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6 *Id.*

7 Reply Comments of XO Communications, LLC, Covad Communications Group, Inc. and NuVox Communications, RM-11358 (filed Apr. 2, 2007) ("Petitioners' Reply Comments") 8-9.

8 Reply Comments of Time Warner Telecom Inc. and One Communications Corp., RM-11358 (filed Apr. 2, 2007) ("TWTC Reply Comments") 17-18 ("The once unforeseen capabilities of copper are underscored by the fact that only one large ILEC, Verizon, has concluded that it is necessary to construct a FTTH network. Nearly every other carrier that is offering a triple play of voice, video and data is using networks with copper loops of a mile or more.").

9 *See* Notice of Inquiry ¶ 20; *In the Matter of Advanced Telecommunications Capability in the United States*, GN Docket No. 04-54, Fourth Report to Congress, FCC 04-208, 19 FCC Rcd 20540 (rel. Sept. 9, 2004). In its Fourth Report to Congress on the availability of advanced telecommunications capability in the United States, the Commission concluded that the following last-mile technologies are used, or in the future, will be used to provide high speed systems: (1) cable modem service; (2) DSL (especially asymmetric

A. Business Services Using Next Generation Copper-Based Technologies

Following the *Triennial Review Order*, new Ethernet over Copper ("EoC") technologies emerged to fulfill the needs of business end users, many of whom, to date, have been unable to obtain high speed and advanced services over next-generation fiber networks.[10] As an example, the 2BaseTL standard, developed by the Metro Ethernet Forum,[11] in cooperation with other standards bodies, provides to business end users "symmetric" services, up to 40 megabits per second, offering the benefits of low delay, high reliability, and spectral compatibility with other digital subscriber line ("DSL") technologies. Importantly, EoC technologies using the 2BaseTL standard may be provided over almost 90 percent of all copper facilities.[12] For example, Mid-Band Ethernet presently is capable of transmission speeds up to 50 megabits per second, over copper loops up to 12,000 feet in length.[13]

The Commenters both have invested substantial resources in deploying EoC technologies to provide business grade high speed and advanced services. For example, XO currently offers to its business customers up to 10 megabits per second of bandwidth, using standards-based Ethernet protocol.[14] Similarly, NuVox uses standards-based Ethernet protocol to offer consumers bundles of voice, Internet access and Virtual Private Network ("VPN") services, at speeds up to 20 megabits per second. Other competitive LECs also introduced EoC technologies for purposes of

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DSL, or ADSL); (3) fiber-based wireline technologies, specifically fiber-to-the-home ("FTTH") and fiber-to the-curb ("FTTC"); (4) licensed and unlicensed wireless technologies; (5) broadband over power lines ("BPL"); and satellite service.

10 Comments of Allan Isfan, Isfan Solutions Inc., RM-11358 (filed Mar. 1, 2007) ("Isfan Comments") 10, appended hereto as *Exhibit A*.

11 The Metro Ethernet Forum is an organization of service providers, equipment vendors and end user customers working to accelerate the worldwide adoption of carrier class Ethernet networks and services. *See* www.metroethernetforum.org.

12 Isfan Comments 10.

13 TWTC Reply Comments 17.

14 Petitioners' Reply Comments at 8.

delivering sophisticated suites of business services, including but not limited to hosted Voice over Internet Protocol ("VoIP") and Internet access services, to customers served only by legacy copper networks.[15] These providers of high speed and advanced services continue to enjoy the support of equipment manufacturers, demonstrating broad ranges of new EoC products tailored to the growing needs of business consumers.[16]

B. Residential Services Using Next Generation Copper-Based Technologies

For the benefit of residential consumers, recent advances in DSL technologies enable transmission of Internet Protocol Television ("IPTV") services, including high definition television ("HDTV") and Video on Demand, and "triple play" bundles of services, including digital video, Internet access and voice services. Specifically, advanced Asymmetric DSL ("ADSL") products (*e.g.*, ADSL2+), and new Very High Speed DSL products (*e.g.*, VDSL2), now deliver transmission speeds up to 50 megabits per second, and even up to 100 megabits per second on shorter loops.[17] In the years following the *Triennial Review Order*, both incumbent LECs and competitive LECs introduced diverse bundled service offerings to residential consumers, using new ADSL2+ and VDSL2 technologies, over legacy copper networks. As an example, in 2006, Covad Communications Group completed its substantial ADSL2+ network, capable of providing voice and high speed data services, to business and residential consumers within twelve markets, at transmission speeds up to 25 megabits per second.[18]

Other providers of high speed and advanced services, including AT&T and Cavalier Telephone, recently adopted ADSL2+ and VDSL2 technologies to support offerings of video

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15 *Id.* 10.

16 *Id.*

17 Isfan Comments 9.

18 Petitioners' Reply Comments 8.

and television services, in addition to voice and data services, at transmission speeds ranging from 15 megabits per second, to 25 megabits per second, over copper loops of up to 12,000 feet in length.[19] Furthermore, those companies adopted the MPEG-4 compression standard, capable of delivering high definition signals using only one half of the bandwidth used by its predecessor standard, MPEG-2, which is the standard used in Verizon's fiber network, and in the networks of most cable companies.[20] Importantly, the ADSL2+ and VDSL2 technologies used to deliver video and television service offerings to residential consumers do not require construction of new fiber loops, and therefore are more cost effective than analogous service offerings, provided over fiber networks.[21]

II. COPPER-BASED WIRELINE TECHNOLOGIES ENHANCE COMPETITION IN THE MARKETS FOR HIGH SPEED AND ADVANCED SERVICES

The copper-based wireline technologies that currently are capable of delivering high speed and advanced services already have encouraged product innovations by competitive LECs, resulting in greater choices among high speed and advanced service offerings, to both business and residential consumers.[22] Importantly, competitive LECs have efficiently used legacy copper facilities, including TELRIC-priced UNEs, to provide high speed and advanced services that compete with the capabilities of next-generation fiber-based offerings. Over time, the Commission may expect that continuing equipment innovations will further enhance the capabilities of copper-based wireline technologies, and accordingly, that legacy copper facilities

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19 *See* TWTC Reply Comments 18-19; Petitioners' Reply Comments at 8-9.

20 TWTC Reply Comments 19.

21 *Id.* 18. For example, AT&T's "U-Verse" network is estimated to cost only 25 percent of Verizon's newly deployed fiber facilities, and is capable of providing high speed and advanced services comparable to Verizon's FiOS offering

22 Petitioners' Reply Comments 8-10; TWTC Reply Comments 16-19.

will remain essential to the full scale deployment of high speed and advanced services to Americans.

III. THE COMMISSION'S RULES APPLICABLE TO RETIREMENTS OF COPPER FACILITIES THREATEN FURTHER DEVELOPMENT OF COPPER-BASED WIRELINE TECHNOLOGIES CAPABLE OF PROVIDING HIGH SPEED AND ADVANCED SERVICES

Where incumbent LECs choose to overbuild legacy copper loop and copper subloop facilities with fiber facilities, the Commission already has concluded that retirement of copper loops and copper subloops impairs the ability of competitive LECs to provide certain services to consumers. In the *Triennial Review Order*, the Commission declared that fiber overbuilds, and subsequent retirements of copper facilities enable the incumbent LECs to effectively deny competitive LECs access to existing copper loops and copper subloops used to serve end users.[23] Thus, through retirements of copper facilities, the incumbent LECs unilaterally may establish and control a barrier to market entry.[24] Notwithstanding the record evidence before the Commission of the competitive harms that may result from incumbent LEC retirements of copper loops and copper subloops, the Commission, in the *Triennial Review Order*, concluded that only modest revisions to the existing public notification requirements for incumbent LEC network changes were needed to protect the public interest,[25] and therefore declined to adopt any of several proposals intended to provide greater scrutiny of copper facility retirements.[26]

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23 *Triennial Review Order* ¶ 277.

24 *Id.*

25 *Id.* ¶ 281.

26 *Id. See also* Letter from Thomas M. Sullivan, Chief Counsel for Advocacy and Cheryl M. Johns, Assistant Chief Counsel for Telecommunications, Office of Advocacy, U.S. Small Business Administration to Chairman Kevin J. Martin, Federal Communications Commission (May 10, 2007) at 2 ("SBA Letter"). Regarding the existing procedures for copper loop and copper subloop retirements by the incumbent LECs, the SBA recently observed that "...the FCC's Part 51 rules fail to consider the potential negative impact of

Consequently, retirements of copper facilities by the incumbent LECs takes place with increasing frequency and with no public interest analysis whatsoever. This alarming phenomenon results in the wasting of America's most ubiquitous and economical platform for delivering high speed and advanced services to small-to-mid-sized businesses and residential consumers.

Given the substantial improvements to copper-based wireline technologies in the years following the *Triennial Review Order*, and the present capabilities of copper facilities to deliver high speed and advanced services to consumers, the public interest harms that will result from disabling or destroying legacy copper infrastructure are more grave than ever. In particular, the adverse impact of copper infrastructure retirements will be suffered acutely by small competitive providers of telecommunications services, and in turn, such retirements will unduly burden the small businesses that they currently serve.[27] Specifically, the Office of Advocacy of the U.S. Small Business Association ("SBA") recently cautioned the Commission that:

> small firm contribution to innovation is the most intense in new and emerging technologies. In the U.S. telecommunications sector, small businesses have become increasingly dynamic by developing new technologies based on the legacy copper network. Small telecommunications providers have been able to offer competitive packages to consumers, rivaling the cable platforms offered in their regions. These and similar offerings have created a wide range of telecom choices for small business customers. The retirement of copper will eliminate these technologies, and any new copper-based technologies currently under development. Small business customers of telecom services fear that their telecom services will become more expensive.[28]

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unilateral network modifications on small businesses... [and] [t]he rulemakings from which these rules were promulgated never considered the economic impact of the final language, and failed to offer any meaningful alternatives." *Id.*

27 *Id.* at 3.

28 *Id.* at 2-3.

In addition, the SBA, the Consumers Union, state regulatory bodies, investors, equipment manufacturers and engineers, and providers of high speed and advanced services overwhelmingly support modifications to the Commission's existing network disclosure requirements that would permit the Commission to evaluate the public interest harms that may result from retirements of copper infrastructure by the incumbent LECs.[29]

In addition to those competitive harms recognized by the Commission, and by interested parties to the Commission's current public rulemaking proceeding, incumbent LEC retirements of copper facilities frustrate the policy goals of Section 706 of the Telecommunications Act of 1996, and are contrary to the mandates of the Commission stated in the *Triennial Review Order*.[30] In particular, the technological developments that enable competitive LECs to provide high speed and advanced services over copper facilities are premised, in large part, on the continuing availability of TELRIC-priced copper loops. To the extent that the Commission permits the incumbent LECs to remove from service essential copper infrastructure, uncertainty will chill investment in and further development of the copper-based wireline technologies that

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29 *Id.* at 3. *See also In the Matter of XO Communications, LLC, Covad Communications Group, Inc., NuVox Communications and Eschelon Telecom, Inc. for a Rulemaking to Amend Certain Part 51 Rules Applicable to Incumbent LEC Retirement of Copper Loops and Copper Subloops; In the Matter of Policies and Rules Governing Retirement of Copper Loops by Incumbent Local Exchange Carriers*, RM-11358, Letter from Jeannine Kenney, Senior Policy Analyst and Mark Cooper, Director, Consumer Research, Consumers' Union to Marlene Dortch, Secretary, Federal Communications Commission (Apr. 2, 2007); Comments of the Pennsylvania Public Utility Commission (filed Mar. 1, 2007); Telecom Investors' Reply Comments (filed Apr. 2, 2007); Comments of Allan Isfan, Isfan Solutions, Inc. (Mar. 1, 2007); Comments of Daniel J. Udovic, P.E. (filed Mar. 1, 2007) and Reply Comments (filed Apr. 2, 2007); Reply Comments of XO Communications, LLC, Covad Communications Group, Inc., NuVox Communications and Eschelon Telecom, Inc. (filed Apr. 2, 2007); Comments of CBB Carrier Services, Inc., Expedient Carrier Services, LLC, Image Access, Inc. d/b/a NewPhone, Line Systems, Inc., LS Networks, RazorLine, LLC and SNiP LiNK LLC (filed Mar. 1, 2007); Reply Comments of Cavalier Telephone, LLC *et al.*; Reply Comments of Time Warner Telecom Inc. and One Communications Corp. (filed Apr. 2, 2007); Reply Comments of DSLNet Communications, LLC (filed Apr. 2, 2007); Reply Comments of WorldNet Telecommunications, Inc. (filed Apr. 2, 2007).

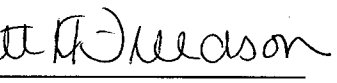
30 *Triennial Review Order* ¶ 244.

presently support high speed and advanced services.[31] Without adequate funding by investors, the equipment innovations contemplated by the *Triennial Review Order*, and realized over the past several years, in turn, will dissipate.[32]

IV. CONCLUSION

The Commenters respectfully submit that the Commission should: (1) take notice, in this proceeding, of technological developments that enable transmission of high speed and advanced services over legacy copper facilities, increasing competition among providers of those services, and expanding service offerings made available to consumers; and (2) consider as a means of ensuring the most widespread and efficient deployment of high speed and advanced services over copper facilities, changes to its existing rules applicable to copper loop and copper subloop retirements that reflect industry and marketplace changes since the *Triennial Review Order*.

Respectfully submitted,



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Counsel to NuVox Communications and XO Communications, LLC

Dated: May 16, 2007

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31 Telecom Investors' Reply Comments, RM-11358, at 5 (filed Apr. 2, 2007).

32 *Id.* 9-10.

EXHIBIT A

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC

In the Matter of	)	
	)	
Petitions for Rulemaking and Clarification	)	
Regarding the Commission's Rules Applicable	)	**RM-11358**
To Retirement of Copper Loops and	)	
Copper Subloops	)	

COMMENTS OF ALLAN ISFAN, ISFAN SOLUTIONS INC.

Allan Isfan ("Commenter") hereby respectfully submits comments to the Federal Communications Commission ("Commission") in response to Public Notice DA 07-209 issued in the above-captioned proceeding. The Public Notice was issued in response to the petitions submitted on January 18, 2007 by (1) XO Communications LLC, Covad Communications Group Inc., NuVox Communications and Eschelon Telecom Inc. seeking to have the Commission initiate a rulemaking to amend certain sections of its part 51 rules applicable to incumbent local exchange carrier ("ILEC") retirement of copper loops and copper subloops; and (2) BridgeCom International, Inc, Broadview Networks, Inc., Cavalier Telephone, LLC, and fourteen other competitive carriers seeking to have the Commission to initiate a rulemaking and clarification regarding the establishment of certain safeguards for ILEC retirement of copper loops.

I. INTRODUCTION

The Commenter has deep knowledge and experience in telecommunications and especially the copper network and associated telephony and broadband technologies. He

has been involved in the definition, development and deployment of advanced telephony and DSL technologies all over North America with products deployed by competitive local exchange carriers ("CLECs"), independent ILECs and nearly all major ILECs.[1]

The ILEC copper plant is an enormous, national asset which has taken over a century to deploy. Because it continues to be capable of meeting the service needs of consumers and businesses alike, it is the primary means of transmission for telecommunications services throughout the country. Legacy line-powered copper loop plant can support very high bandwidth and ultra advanced services. Incredible advances continue to this day, and even more amazing advances are on the horizon. For consumers and business users, the copper network infrastructure remains a vital resource capable of supporting very reliable telephony services, high-speed internet access and video programming, and every increasing amounts of bandwidth for data transfer. In short, copper plant, by virtue of its ubiquitous deployment, line-powered reliability and its ever increasing bandwidth capabilities, is uniquely capable of serving and continuing to serve the needs of consumers and businesses. Consequently, the Commission should act promptly to ensure this national asset is preserved and developed to its maximum

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[1] Allan Isfan has worked in the telecommunications industry for over 14 years and has extensive experience in aspects of product development and market introduction. He has been working in the DSL space since deployment began and has deep knowledge in technology, customer networks and the outside plant. He has worked directly with tier 1 customers and played a key role in defining and developing market ready products that have achieved nearly $100M in sales per year. Prior to launching Isfan Solutions Inc. and joining a venture capital firm as an Entrepreneur in Residence, he was Senior Product Marketing Director at Ciena, culminating in a key role in the CTO office. He was a Senior Principal Engineer at Catena Networks, a successful start-up he joined within months of its inception, which was acquired by Ciena. He was also an R&D manager, system architect and IC designer at Nortel earlier in his career. He has been awarded several patents for advanced products. He holds a Bachelor of Engineering from the University of Ottawa with a specialty in Electrical Engineering.

potential. Efforts to retire copper plant should be prohibited and deemed antithetical to the public interest.

The United States is already behind many of its counterparts in terms of broadband penetration and bandwidth.[2] Retiring copper and blocking access to this resource will only exacerbate this problem. Some might argue that maintaining the copper network is slowing down broadband progress due to the associated cost. They might suggest that it would be best to concentrate only on fiber deployments, but this logic is counterproductive and will ultimately have the opposite effect. Allowing the copper infrastructure to be retired and fall into disrepair will lead to a dramatic void whereby advanced services capabilities and products will cost more and take far more time to enter the market.

The main goal of these comments is to provide technical background on the state of outside telephony plant today and describe new copper-based technologies that can provide very high bandwidth and advanced services to residential and business customers. As explained herein, copper infrastructure continues to be capable of meeting the needs of consumers and business for evolving and increasing amounts of bandwidth with line-powered reliability. Ensuring that CLECs continue to have access to this national resource will benefit consumers and businesses through the availability of innovative and reliable broadband services at competitive prices.

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2 *See*, http://www.informationweek.com/shared/printableArticle.jhtml?articleID=197006038

II. OUTSIDE PLANT BACKGROUND

The most common configurations of telecommunications outside plant architecture are shown in the diagram below: 1) "home run" copper; 2) Digital Loop Carrier ("DLC"); 3) Fiber To the Curb ("FTTC"); and 4) Fiber To The Home ("FTTH").

Home Run Copper

Home Run Copper consists of direct connections between the central office and end customers. The copper may go through a cross connect called a Serving Area Interface ("SAI") which is a simple passive cross connect, *i.e.* wires from the Central Office ("CO") are connected to wires going to customers through simple jumper wires. Although there is a lot of talk about advanced outside plant technologies, as of 2002, approximately 75% of loops were served directly out of the CO.[3]

Digital Loop Carriers

DLCs were developed to minimize the number of physical copper wires going from COs to end customers, especially when customers are far away. DS1s have been used to connect DLCs to the Class 5 voice switches since each DS1 can digitally multiplex twenty-four conversations onto two pairs of copper. The DS1s were initially transmitted over copper all the way to the Remote Terminals ("RT") that contained the Digital Loop Carriers ("DLC"). As fiber technology was developed, the DS1s were carried over fiber through the use of fiber multiplexers ("mux"), typically using the SONET standard. Roughly 75% of DLCs are fiber fed with the final connection to the

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[3] *An Excess of Access: U.S. Access Equipment Market Brief, Issue 2.* Millennium-Skyline Project, December, 2003.

end customer still being over copper. This is important because it implies that the incumbents must continue to operate all necessary copper management systems including inventory, repair, test and associated technical staff.

In some cases, DLCs were deployed where there was service to an existing area already over long "home run" copper loops and most of the services were cut over to the new DLCs. In these overbuild cases, the "home run" copper was kept in place and in some cases was used for services that could not be provided by the DLC. In other cases, this copper was retired.

The retiring of the original copper loops by the incumbents results in blocking of direct access to customer from the CO. The only recourse available to CLECs in such cases is to lease DS0s or DS1s from the incumbent. DS0s provide 64kbps of bandwidth and DS1s provide 1.544Mbps of bandwidth, far less than what the CLEC could provide to their customers if they had direct access to the copper as will be shown below. This in effect forces the CLECs to pay a high price for the use of old technology to serve their customers and ultimately has a detrimental impact on consumers and businesses.

Fiber To The Curb

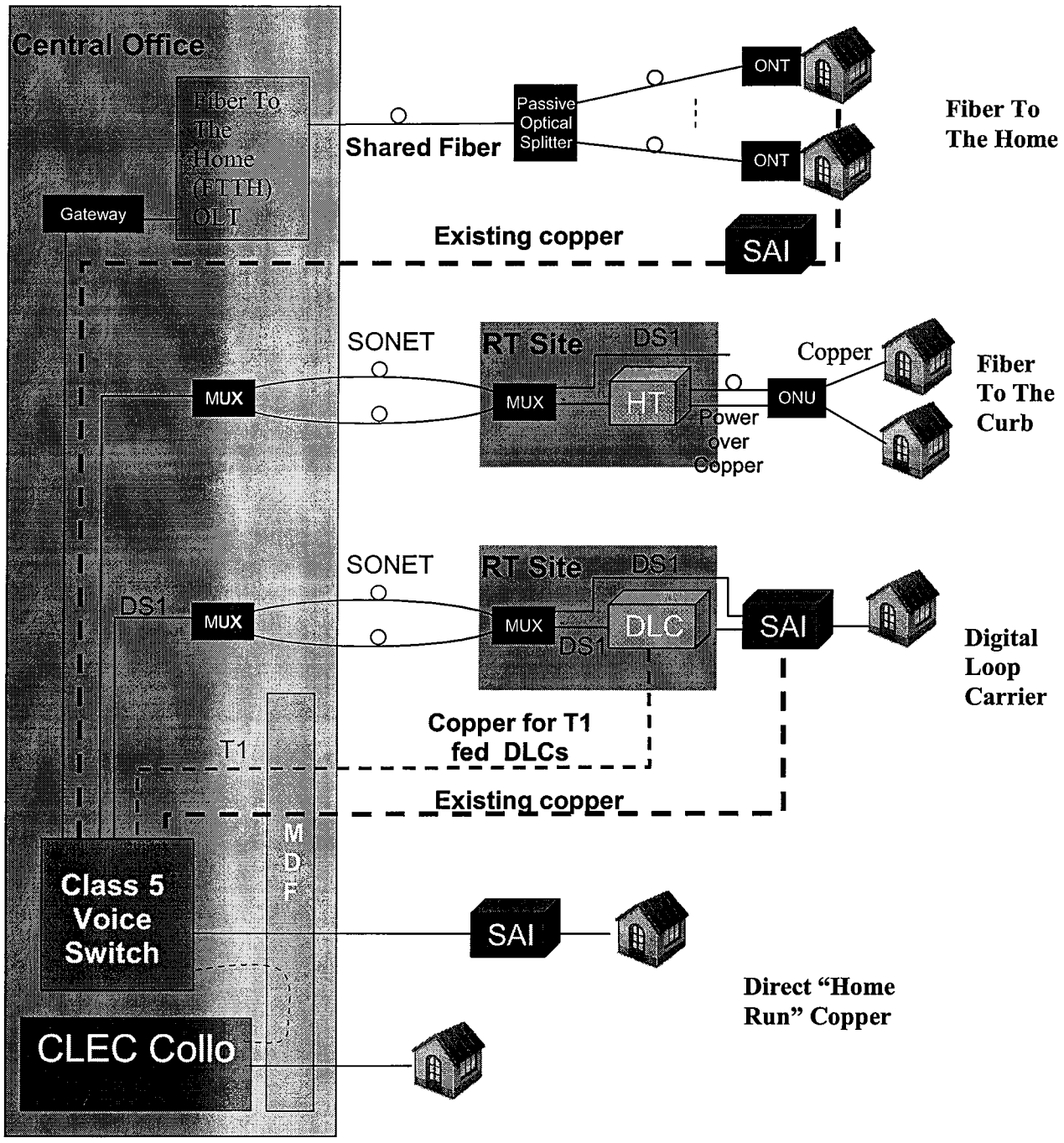
FTTC is essentially an extended case of a DLC with the final link to the customer still being copper. Deployment consists of a large RT cabinet that uses fiber to communicate with a number of Optical Network Units ("ONUs") that typically provide service to approximately twelve homes. The ONUs are powered over copper pairs sourced from the RT cabinets.

Fiber To The Home

FTTH consists of deploying fiber from the central office all the way to a customer's residence or business and includes, in passive architectures, no active electronics in the field. An Optical Network Terminal ("ONT") deployed at the customer location, often on the side of the house, is used to convert the signal transmitted over fiber back to regular analog telephone and Ethernet for data connections.

Note that the ONT deployed at the customer location includes active electronics and must be powered to provide service, including basic voice and 911 services. A rechargeable backup battery pack is provided with the installation and is meant to provide backup power for 4 hours which is about half the typical telecommunications equipment requirement. When the battery runs out, telephone and internet service no longer work. Note also that consumers are typically responsible for replacing old batteries.

FTTH is being used for Greenfield and overbuild (or Brownfield). In the overbuild case, customers that have not signed on to the FTTH service continue to be served over copper. Until the take rate is 100%, the copper infrastructure must be maintained. It is highly doubtful that 100% penetration will ever be reached, unless of course the incumbent can force customers to switch. The reality is that copper should and will have to be maintained for many years to come.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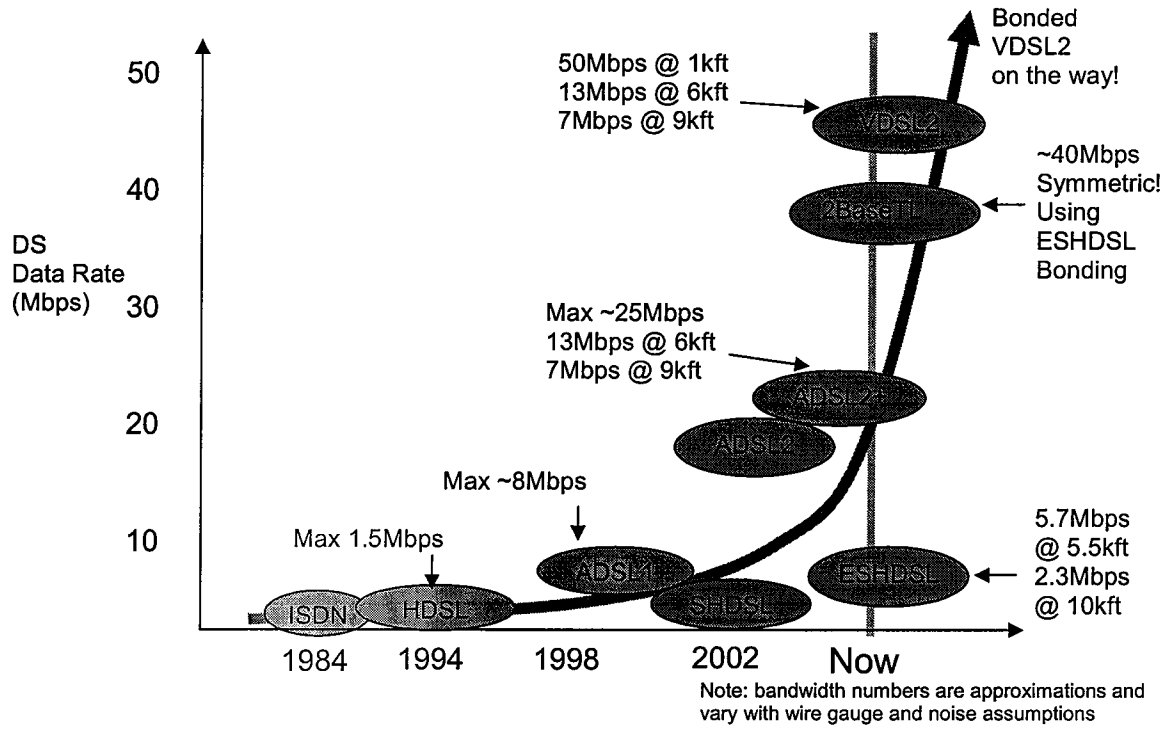
III. THE POWER OF COPPER

The copper plant has served the country extremely well for over a century. When the internet age began and the concept of broadband over copper was being discussed in technical circles, there was some doubt about copper's ability to deliver broadband. Fortunately, the innovators pressed on and their work resulted in tens of millions of consumers taking advantage of the Digital Subscriber Loop ("DSL") technology that ensued in order to get connected to the internet at high speed.

The advances in the short years since DSL technology was deployed have been breathtaking as can be seen in the diagram below. Innovation along the ramp continues at an incredible pace. Very advanced technologies are already available and new advances continue to be developed taking bandwidth and associated services far beyond what was thought possible only a few years ago.



ADSL2+ and VDSL2

One of the most popular broadband technologies in the world is ADSL. It originally started out as ADSL Lite capable of 1.5Mpbs, but it quickly evolved to ADSL2+ which can provide 25Mbps/pair. The VDSL2 standard uses similar technology but can provide 50Mbps/pair and even 100Mbps/pair on short loops (less than 1000 feet). Thus, ADSL2+ and VDSL2 can provide enough bandwidth to support IPTV services such as HDTV and Video-on-Demand. Not only are these capabilities available today but further advances, such as Digital Spectrum Management and multi-pair bonding, are making it possible to send very high-speed transmissions at even greater distances.

Ethernet over Copper

ADSL2+ and VDSL2 are primarily focused on the residential market and therefore skew the spectrum to provide more bandwidth downstream than upstream. However, business customers require symmetric services. In addition, they require lower delays through the network and more reliable services. These customers have traditionally been served using DS1s, but the bandwidth limitations and spectral compatibility with other DSL services prompted the standards bodies to develop the SHDSL and Enhanced SHDSL standards bringing the bandwidth per pair to 2.3Mbps and 5.7Mbps, respectively. Prompted by the proliferation of Ethernet services, the Metro Ethernet Forum and other standards bodies developed the 2BaseTL standard in order to bring Ethernet to customers that do not have access to fiber, which as it turns out, represents the large majority of business customers.

What is particularly interesting about 2BaseTL is that it supports bonding of multiple pairs pushing the bandwidth possible to roughly 40Mbps symmetric. The low delay, high reliability and spectral compatibility with other DSL technologies as well as legacy T1 make this an ideal technology for business services. The long reach of 2BaseTL coupled with the ability to bond multiple pairs allows Ethernet over Copper technology to be deployed over nearly 90% of loops.[4] Access to Ethernet at these speeds is a huge benefit for business customers.

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[4] As indicated earlier, as of 2002, 75% of the loops were home run copper from the CO to the customer premises, and most of these are within the distance limitations of the Ethernet over Copper technology and standard. The remaining loops originate in the RT. As a practical matter, under the Commission's current rules, collocation at the RT is not feasible.

Ethernet over Copper products using 2BaseTL are available from several vendors. To continue on the innovation curve and serve customers with even more advanced services, vendors are already developing the next generation of products. These products will use VDSL2 coupled with advanced noise canceling techniques as well as bonding and will easily surpass the 100Mbps symmetric bandwidth mark on the way to 1000Mbps.

Power over Copper

It is exciting to talk about bandwidth but sometimes safety is what matters most. Telephony grade copper has long been used to power devices at the other end of the line to ensure ultra reliable service. This is a critical consideration in light of the natural catastrophes and national security concerns these last few years. The existing copper network is a vital resource that can be used as a back-up even where fiber is used as the primary high bandwidth technology.

Line powering technologies also are used to power more energy-intensive equipment, such as DSLAMs and business access devices. This helps to ensure business continuity and access to telecommunications services in the event of extended power failures.

In sum, retiring and ultimately removing copper that is already deployed and highly available is ultimately a very risky proposition from a national safety and security point of view.

IV. WHY ALL THIS BANDWIDTH IS NEEDED

The popularity of the internet has made broadband connectivity virtually essential for consumers, and the bandwidth requirements are escalating. Websites now feature multimedia content such as news clips, music videos, music downloads, streaming audio and video and many other bandwidth intensive services. Software purchases and upgrades are now primarily done over the internet. Many applications and services now run directly over the internet from network-based servers. Interactive and on-demand digital television over ADSL2+ and VDSL2 is being deployed around the world and the United States. All of these services need bandwidth and lots of it. For example, streaming a single HDTV channel requires transmission speeds of approximately 8-10Mbps. An acceptable IPTV service takes at least 12Mbps assuming several simultaneous channels, and 20-30Mbps is required to support premium service with multiple HDTV channels.

An increasingly large number of businesses have substantial bandwidth needs of their own, and these needs are also growing larger. The medical community in particular has acute bandwidth requirements. This is primarily driven by the industry effort to digitize all paperwork and especially x-rays, MRIs and all other important documents such as prescriptions. This digitization has been proven to save money in the long run by allowing qualified physicians to access records on-line and avoid duplicate tests and conflicting prescriptions.

Schools need reliable, high bandwidth and affordable internet connectivity. Students and staff require increasing access to the internet, and schools regularly transmit video and other large files among themselves and to a central location. The addition of

distance learning also brings with it the need for multimedia that just cannot be handled without high bandwidth.

The financial community is yet another sector that is in need of bandwidth. The popularity of online banking and trading in addition to the migration of many internal processes to digital form continue to push bandwidth requirements. The addition of off-site data storage pushes bandwidth requirements even further.

In light of national catastrophes and an increasing dependence on electronic documents and processes, regular remote and duplicate storage is becoming extremely popular and necessary with many organizations including government, schools, clinics and hospitals, banks and other financial institutions.

There should be little doubt that there is a real thirst and need for high speed internet connectivity. There is a very real demand from consumers but even more importantly, businesses need it to survive and compete. Everything should be done to ensure affordable high bandwidth to consumers and especially businesses. Ensuring the copper plant is maintained and that CLECs have access to it is critical to ensure people have access to the bandwidth they require at competitive prices.

V. MAINTENANCE OF THE COPPER INFRASTRUCTURE

As was shown in the background section, the telecommunications industry continues to rely heavily on copper even in light of advanced architectures such as fiber fed DLCs, FTTC and FTTH. In the case of DLC and FTTC models, the final connection to the customer continues to be copper. In the case of FTTH, there is indeed fiber

running all the way from the CO to the home, but, until there is 100% take rate, the copper will still be required.

It is quite apparent that copper is and continues to be a major component of the incumbent's telecommunications infrastructure. As a matter of fact, ILECs continue investing in this infrastructure by deploying ADSL, VDSL, 2BaseTL, DS1 and other copper-based services. They will therefore need to continue running all their operational systems including testing, databases, inventory, repair, marketing and all the related staff.

In light of this, it is believed that the cost associated with continuing to provide unbundled access to copper loops to third parties is actually very low and should be covered by existing TELRIC pricing. This unbundling can actually be beneficial to the incumbents since it allows them to obtain revenue from loops they may no longer be using.

VI. SUMMARY AND CONCLUSIONS

The telecommunications industry has relied on copper as a key component of the overall telecommunications infrastructure for over a century. Not only does the copper plant support telephony services, but it also is instrumental in providing broadband services to consumers and businesses. It has already surpassed all expectations in terms of the bandwidth it can provide. It is now possible to deliver upwards of 40Mbps symmetric bandwidth, and 100Mbps is imminent. Innovators are already working on technology that will support greater than 100Mpbs and are shooting for 1000Mbps (1 Gbps).

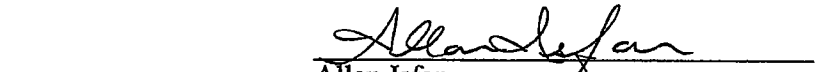
All this bandwidth is in high demand. Consumers are asking for it, and businesses need it to thrive. Fiber is a great answer but unfortunately it is costly and simply not available in most locations. At the very same time, we have almost universal access to copper plant. Copper will continue to be the best and only answer for a vast majority of connectivity requirements. Even incumbents continue to invest billions of dollars in copper-based technologies for the majority of their services and revenue.

The unfortunate disasters that have impacted our lives over the last few years have highlighted the need for communications during times of need. When safety and national security are at stake, reliable, well understood technologies and facilities like line-powered copper loop must be kept operational.

It is therefore highly surprising and disturbing that this critical resource is now being retired, especially given the enormous costs required to deploy any transmission facilities and the tremendous value of these facilities. Consumers can be served with advanced services using this great resource, and incumbents can continue generating revenue from loops they no longer use by permitting others to maximize its capabilities.

It is in the public's best interest to stop retirement of copper loops and ensure the existing copper is properly maintained so that it can be used by incumbents and CLECs to serve customers with advanced and affordable services.

Respectfully submitted,



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